

reported along the streams of northern and western Pennsylvania, and northern and eastern Ohio. The observer at Marquette, Mich., reports that during a storm of high westerly winds, rain, and flurries of snow, the schooner "Comrade" was wrecked, and the crew, consisting of eight men, drowned. A moderate thunder-storm passed over Abilene, Tex., in the morning, during which a house was struck by lightning and considerably damaged. 15th.—A severe thunder-storm prevailed at Jacksonville, Fla., from 2.15 to 7.30 p. m., during which a flagstaff on the Everett Building was struck by lightning and demolished. A thunder-storm, with heavy rain, occurred in the evening at Palestine, Tex., and lightning caused some damage to buildings. 16th.—A very heavy thunder-storm swept over Long Island in the morning; telegraph poles were shattered and several buildings were struck by lightning. The storm was also very severe over Rhode Island and south-east Massachusetts, where the rainfall was excessive, and several persons were killed and much damage was caused by lightning. A cloud-burst occurred about a mile north of Le Roy, Pa., in the evening, causing damage to roads, fences, etc. At Key West, Fla., a heavy thunder-storm, moving from the northeast, set in 9.55 p. m., eastern time, with a squall of wind which attained a velocity of 37 miles per hour. A house was struck and considerably damaged by lightning. 17th.—A thunder-storm began at New York City at 7.50 a. m., eastern time, and ended 11.40 a. m., and from 7.52 to 7.57 a. m., 5 minutes, 0.35 inch of rain fell. Considerable damage was done in the lower part of the city and in the eastern part of Brooklyn, by flooding of cellars, etc., and in Jersey City a telephone office was struck by lightning and damaged to the extent of about \$5,000. Great damage was caused by floods resulting from heavy rain in parts of Connecticut. Heavy rain, attended by peals of thunder in the east, began at Yuma, Ariz., at 8.40 a. m., and lasted 25 minutes, during which time 0.64 inch of rain fell. The heavy rain caused washouts on the railroad a few miles east of Yuma.

18th.—Crops in Monmouth Co., N. J., were reported badly damaged by heavy rains and severe gales. In the afternoon a heavy storm, with lightning and high wind, prevailed over a large portion of Iowa, and caused considerable damage in localities. Near Manilla, Crawford Co., Iowa, a wind storm from sw., with heavy rain, occurred about noon. The storm,

which lasted but a few minutes, demolished a residence and out-houses 2 miles east of Manilla and killed one person. A heavy rain and thunder-storm occurred at Vinton, Iowa; damage \$1,000. At West Bend, Iowa, some damage was caused by lightning. At Alta, Iowa, several head of cattle were killed, and a number of children in a school-house were stunned by lightning. At Fayette, Iowa, a severe storm occurred about 5 p. m., unroofing a house, and completely demolishing a farm house. A heavy thunder and hail storm occurred at Wakefield, Kans., at 4.25 p. m. The hail was of unusual size. At Tampa, Fla., a severe thunder and rain storm began 5.15 p. m., eastern time, with brisk sw. wind. Hail fell in the north part of the town, and one man was stunned and a cow killed by lightning. 20th.—A severe wind and hail storm was reported in the lower part of Pulaski Co., Ga., in the afternoon. 21st.—A severe thunder-storm in the morning was reported at Palmetto, Ga., during which a dwelling was struck by lightning. 22d.—At Tampa, Fla., a heavy rain in the evening flooded the streets and rendered them almost impassable. Heavy rain flooded streets and caused great damage to Hot Springs, Ark. A severe wind storm was reported at Dresden, Navarro Co., Tex., in the afternoon. A very severe hail storm occurred at Strawberry, Ariz., and it was reported that hail lay in drifts 1 to 1½ feet deep 5 days after the storm. 23d.—A destructive rain storm was reported at Helena, Ark., in the evening; streets and houses were flooded. 24th.—At Memphis, Tenn., rain began 2.10 p. m., and in 36 minutes 1.35 inch fell; crops were damaged in that vicinity. 25th.—Heavy rain and a ne. to e. gale prevailed at Wilmington, N. C., damaging cotton and causing small washouts on railroads. 27th.—During a thunder-storm in the afternoon at Tampa, Fla., a dwelling was struck by lightning and set on fire. 29th.—Heavy rain in the afternoon caused great damage to raising grapes near Fresno, Cal.; the damage being estimated at \$500,000.

WATER-SPOUTS.

A water-spout, presenting a beautiful appearance, and moving from southeast to northwest, was observed about 4 miles west of Hatteras, N. C., at 8 a. m. of the 25th, during a heavy rain storm. A second and incomplete water-spout, extending about half way from the cloud to the water, formed near where the first one appeared at 8.05 a. m.

INLAND NAVIGATION.

FLOODS.

From the 10th to 13th great damage was caused by the overflow of streams in central and western New York. The Che-mung River and tributaries were swelled, causing an overflow and considerable damage at Elmira. The Canistota River flooded its banks at Canistota. The overflow of the Mohawk River flooded thousands of acres of meadow and tilled land. The Cohocton River overflowed its banks at several points, causing landslides, washouts on railroads, and other damage. At Ithaca the fair ground was flooded and much live stock drowned. The Genessee River was greatly swelled. The Black and Salmon rivers, and small streams in Oswego county, were very high. On the 14th a 7-foot freshet was reported in the Hudson River at Albany. In Pennsylvania the tributaries of the Allegheny River were reported high and overflowing. At New Castle the lower part of the city was flooded, and the Neshannock River was over its banks. At Bradford both branches of the Tuna River overflowed, flooding the lower streets, and causing washouts on railroads. The Susquehanna River rose to an unusual height at Wilkes Barre, flooding lowlands. At Harrisburg the river rose 7 feet on the 13th. In West Virginia high water and much drift-wood was reported at Parkersburgh on the 7th and 12th to 16th. On the 12th the Ohio river rose 4 feet 7 inches at that place. A sud-

den rise in the Gawley River carried away 31 loaded coal barges at Charleston, 11 of which were lost. On the 12th and 13th the Little Kanawha River rose rapidly, causing much damage. In Ohio the Scioto River had risen to a dangerous height on the 12th, causing considerable damage to property and loss of live stock. At Columbus the stage of the water was one foot below that of last May, when the river began to fall. The Sandusky River was very high. The Tuscarawas River rose rapidly, flooding the valley. At Cincinnati large quantities of drift-wood were observed on the 14th, and the Ohio River had risen over 3 feet in 24 hours at that point. Drift-wood was also reported at Cincinnati on the 16th and 17th. Great damage was reported in the Muskingum Valley by high water. The Hocking River rose rapidly, doing much damage. Considerable drift-wood was reported in the Ohio River at Cairo, Ill., on the 20th. High water carried away many bridges in Connecticut about the middle of the month. From the 10th to 12th considerable damage was caused by flooding of streams near Eagle Pass, Tex. The Rio Grande River was reported over its banks at Eagle Pass, causing much damage to railroad and other property.

LOW WATER.

In parts of Missouri, Iowa, Kansas, Nebraska, South Dakota, and Minnesota streams were reported very low, and in some instances, dry.

STAGE OF WATER IN RIVERS AND HARBORS.

The following table shows the danger-point at the several stations; the highest and lowest water during September, 1890, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, September, 1890 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La.	29.9	30	5.2	7	2.2	3.0
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	19	10.6	15	2.7	7.9
Little Rock, Ark.	23.0	26	15.6	10, 11	6.1	9.5
<i>Missouri River.</i>						
Fort Buford, N. Dak.		10	3.3	30	0.8	2.5
Sioux City, Iowa.		1	5.9	24	4.1	1.8
Omaha, Nebr.	18.0	15	7.6	25, 26, 28, 29	6.4	1.2
Kansas City, Mo.	21.0	1	6.2	30	4.6	1.6
<i>Mississippi River.</i>						
Saint Paul, Minn.	14.5	9, 10	2.3	29	1.6	0.7
La Crosse, Wis.	13.0	11 to 15	5.0	1	3.5	1.5
Dubuque, Iowa.	16.0	15, 16	5.9	2	3.7	2.2
Davenport, Iowa.	15.0	17	3.6	3	2.2	1.4

Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Mississippi River—Continued.</i>						
Keokuk, Iowa.....	14.0	19, 20	3.4	3, 4	2.0	1.4
Saint Louis, Mo.....	32.0	22 to 24	8.3	18, 19	6.9	1.4
Cairo, Ill.....	40.0	24-25	20.4	13	10.5	9.9
Memphis, Tenn.....	34.6	27 to 29	16.0	1, 2, 15	8.5	7.5
Vicksburg, Miss.....	41.0	30	21.6	1, 2	10.2	11.4
New Orleans, La.....	13.0	30	5.3	1, 19	3.8	1.5
<i>Ohio River.</i>						
Pittsburgh, Pa.....	22.0	14	15.2	4	2.8	12.4
Parkersburgh, W. Va.....	38.0	15	27.2	5	4.9	22.3
Cincinnati, Ohio.....	50.0	18	35.2	7	11.1	24.1
Louisville, Ky.....	25.0	18, 19	12.5	7, 8	6.4	6.1
<i>Cumberland River.</i>						
Nashville, Tenn.....	40.0	17	15.0	9	2.6	12.4
<i>Tennessee River.</i>						
Chattanooga, Tenn.....	33.0	1	7.6	9, 10	2.8	4.8
<i>Monongahela River.</i>						
Pittsburgh, Pa.....	29.0	14	15.2	4	2.8	12.4
<i>Savannah River.</i>						
Augusta, Ga.....	32.0	30	24.2	21	6.5	17.7
<i>Willamette River.</i>						
Portland, Oregon.....	15.0	1	4.1	23, 24	0.9	3.2

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were reported as follows: 3d, Mount Washington, N. H.; Northfield, Vt.; and Salem Corners, Pa. 8th, Medford, Minn. 10th, Cresco, Iowa; Orono, Me.; and Madison, Wis. 11th, Detroit and Mantou, Mich.; Madison, Iowa; Orono, Me.; Madison and Potosi, Wis. 12th, Webster, S. Dak. 14th, Bar Harbor, Me. 15th, Webster, S. Dak. 16th, Mount Washington, N. H.; Cresco, Iowa; and Madison, Wis. 18th, Mount Washington, N. H. 19th, Mount Washington, N. H.; Fort Buford, N. Dak.; Huron, Webster, and Wolsey, S. Dak.; Cresco, Iowa; Orono and Bar Harbor, Me.; Newburyport, Mass.; and Embarrass, Wis. 20th, Kent's Hill, Me. 21st, Webster, S. Dak. 28th, Columbus, Ohio. 30th, Mount Saint Mary's, Md.

Fort Buford, N. Dak., 19th: an aurora was first observed 10.53 p. m., at altitude about 8°, and extended over 50° of azimuth between north and east. The arch was about 2° in width and of a light gray color. The arch continued to rise and extend and increase in brightness until 12.50 a. m., 20th, when it attained its maximum intensity, reaching altitude about 55°, and covered about 75° of azimuth. The color was white and continued so until 1.20 a. m., when it became dimmer, with the arch irregular and receding. The dark segment was well defined during part of the display. At 2 a. m. only a few traces remained visible. No streamers or material changes were observed during the entire display.

Columbus, Ohio, 28th: an aurora was visible from 9 p. m. to 10.30 p. m.; it consisted of a narrow band of pure white light with well-defined edges, about 5° wide, forming an arch rising to altitude about 80°, and extending from about 90° to 270°

azimuth. There was a slow flow and ebb of the light, moving from west to east through the band, about doubling the brightness at the crest of the flow. There was an indefinite show of white light low down about the north part, too faint to be more than barely noticeable. The moon was shining with unusual brilliancy and prevented a view of the greater portion of the aurora where the latter was faint.

THUNDER-STORMS.

The more severe thunder-storms of the month are described under "Local storms." East of the Rocky Mountains thunder-storms were reported in the greatest number of states, 35, on the 5th; in 20 to 28 on the 6th, 7th, 8th, 12th, 13th, 15th, and 16th; in 10 to 19 on the 1st to 4th, 9th, 10th, 11th, 14th, and 18th to 24th; and in 4 to 9 on the 25th to 30th.

East of the Rocky Mountains thunder-storms were reported on the greatest number of dates, 30, in Fla.; on 20 to 24 in Ga., La., Miss., and S. C.; on 10 to 19 in Ala., Ill., Iowa, Kans., Md., Mich., Minn., Mo., Nebr., N. Y., N. C., Ohio, Pa., S. Dak., Tenn., Tex., Va., and Wis.; and on 3 to 9 in Ark., Conn., D. C., Ind., Ky., Mass., Mont., N. H., N. J., N. Dak., R. I., Vt., and W. Va. West of the Rocky Mountains thunder-storms were reported as follows: Ariz., 1st, 2d, 3d, 5th to 9th, 14th to 17th, 22d, 23d, 24th, and 30th; Colo., 1st, 2d, 3d, 6th, 8th, 10th, 13th, 16th, 20th, 21st, and 23d to 26th; Cal., 19th, 21st, 24th, and 26th to 29th; Idaho, 30th; Nev., 25th, 26th, 28th, and 29th; N. Mex., 3d, 5th, 13th, 22d, 27th, and 30th; Oregon, 28th and 30th; Utah, 1st, 2d, 5th, 10th, 11th, 16th, 19th, 22d, 25th, 29th, and 30th; Wash., 2d; Wyo., 2d. There were no states or territories in which thunder-storms were not reported.

MISCELLANEOUS PHENOMENA.

DROUGHT.

Drought prevailed in a large part of the northeast section of Missouri during the month, and, in connection with the dry weather of previous months, resulted in short crops, excepting wheat. Water for stock was scarce and poor, and land dry and difficult to prepare for fall seeding. A report from Nodaway Co., northwest Missouri, stated that water for stock was failing, and the ground too dry to plow. In east-central and southeast Iowa streams were reported low, water for stock scarce, and the ground dry. A report from Independence,

southeast Kansas, stated that creeks and pools that were not dried up were lower than ever before, and that water for stock was very scarce. At Howe, southeast Nebraska, the drought was broken on the 7th. At Wolsey and Woonsocket, southeast South Dakota, streams and wells were reported going dry, and the ground drier than in 10 years. At Marshall and Montevideo, southwest Minnesota, drought continued during the month, streams were reported lower than for 13 years, and at Marshall the Redwood River was dry. At North Lewisburgh, west-central Ohio, the drought was broken on the 4th. At Staunton, north-central Virginia, the drought was broken on